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EXAMINER	
NGUYEN, HOAI AN D	

ART UNIT	PAPER NUMBER
2858	

DATE MAILED: 10/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/817,415	RICHARDSON ET AL.	
	Examiner	Art Unit	
	Hoai-An D. Nguyen	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 September 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) *7-9 and 23-25* is/are withdrawn from consideration.

5)☒ Claim(s) *10* is/are allowed.

6)☒ Claim(s) *1-5,11-19,21,22 and 26-30* is/are rejected.

7)☒ Claim(s) *6 and 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 11, 12, 14, 21 and 26-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Downing et al. (US 5,124,662 A) in view of Gondar (US 5,667,565 A).

Downing et al. teaches particle classification employing plane polarized radiation applied in three orthogonal directions comprising:

With regard to claims 1, 14 and 21, a resonant cavity (FIG. 1, cavity 10) having a high E field sensing region, means (FIG. 1, microwave generators 24) for feeding power to the cavity, means (FIG. 1, any convenient manner as disclosed in column 2, lines 56-65) for directing an airborne particle through the high E field sensing region of the cavity, and sensing means (FIG. 1, detectors 28) coupled to the cavity for sensing the drop (marked effect as disclosed in column 3, lines 47-51) in E field level caused by the particle and outputting a signal representative thereof (Column 1, lines 38-48 and from column 2, line 56 to column 3, line 55).

With regard to claim 11, a resonant cavity (FIG. 1, cavity 10) with an input port (FIG. 1, entry opening 12) and an opening (FIG. 1, exit opening 14) near said input port and having a high E field sensing region, means (FIG. 1, microwave generators 24) for feeding power to the cavity, means (FIG. 1, any convenient manner as disclosed in column 2, lines 56-65) for

directing an airborne particle through the high E field sensing region of the cavity, and sensing means (FIG. 1, detectors 28) coupled to the cavity for sensing the drop (marked effect as disclosed in column 3, lines 47-51) in E field level caused by the particle and outputting a signal representative thereof (Column 1, lines 38-48 and from column 2, line 56 to column 3, line 55).

With regard to claim 12, a resonant cavity (FIG. 4, cavity is round cylindrical in shape) having dimension wherein its height (FIG. 4, the longer side of the cylindrical cavity) is greater than its width (FIG. 4, the shorter side of the cylindrical cavity) and having a high E field sensing region, means (FIG. 1, microwave generators 24) for feeding power to the cavity, means (FIG. 1, any convenient manner as disclosed in column 2, lines 56-65) for directing an airborne particle through the high E field sensing region of the cavity, and sensing means (FIG. 4, detector structure 306) coupled to the cavity for sensing the drop (marked effect as disclosed in column 3, lines 47-51) in E field level caused by the particle and outputting a signal representative thereof (Column 1, lines 38-48, from column 2, line 56 to column 3, line 55 and column 4, lines 32-48).

Downing et al. teaches all that is claimed as discussed right above, including means (any convenient manner as disclosed in column 2, lines 56-65) for directing an airborne particle through the high E field sensing region of the cavity, but it does not specifically teach the following:

- A suction device for directing.

In this case, applicant is trying to use a suction device for directing an airborne particle through the high E field. Downing et al. teaches particle classification employing plane polarized radiation applied in three orthogonal directions using any convenient manner for directing an airborne particle through the high E field. However, it does not explicitly disclose a

suction device. Therefore, it would be reasonable to one having ordinary skill in the art to search for a solution in the field of particulate collection art, and Gondar offers a solution in resolving the particular problem with which the inventor was concerned, to use a suction device for directing an airborne particle through the high E field.

Gondar teaches an aerodynamic-electrostatic particulate collection system comprising:

With regard to claims 1, 11, 12, 14 and 21, a suction device (FIG. 1, vacuum subsystem 20) for directing an airborne particle through the high E field (Abstract and from column 4, line 57 to column 5, line 11).

With regard to claims 26-30, the suction device is operable to direct an aerosol distribution of the airborne conductive or dielectric particles, including the airborne particle. (Abstract and from column 4, line 57 to column 5, line 11).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the particle classification employing plane polarized radiation applied in three orthogonal directions of Downing et al. to incorporate the teaching of using a suction device for directing an airborne particle through the high E field taught by Gondar since Gondar teach that such an arrangement is beneficial to provide statistically valid data available at all times during an analysis run as disclosed in the abstract.

3. Claims 2 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Downing et al. in view of Gondar and Coulter et al. (US 3,603,875 A).

Downing et al. and Gondar teach all that is claimed as discussed in the above rejection of claims 1, 11, 12, 14 and 21, but they do not specifically teach the following:

- The output signal is proportional to the volume concentration of the particles.

However, Coulter et al. teach particle analyzing method and apparatus employing multiple apertures and multiple channels per aperture comprising:

With regard to claims 2 and 16, the output signal is proportional to the volume concentration of the particles (Column 12, lines 57-62).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the particle classification employing plane polarized radiation applied in three orthogonal directions of Downing et al. to incorporate the teaching of outputting a signal proportional to the volume concentration of the particles taught by Coulter et al. since Coulter et al. teach that such an arrangement is beneficial to provide statistically valid data available at all times during an analysis run as disclosed in the abstract.

4. Claims 3 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Downing et al. in view of Gondar and Russell et al. (US 6,263,744 B1).

Downing et al. and Gondar teach all that is claimed as discussed in the above rejection of claims 1, 11, 12, 14 and 21, but they do not specifically teach the following:

- Means for measuring the air volume flow rate, and means for counting the number of signals outputted by the sensing means per unit time.

However, Russell et al. teach an automated mobility-classified-aerosol detector comprising:

With regard to claims 3 and 17, means (FIG. 1, flow meters 140 and 142) for measuring the air volume flow rate, and means (FIG. 1, condensation nucleus counter (CNC) 162) for counting the number of particles in the sample flow per unit time (From column 5, line 65 to column 6, line 43).

As inherency from Downing et al. reference, each time a particle enters the cavity, the E field drops, then the sensing means senses the drop of the E field and outputs a signal. Therefore, the number of signals outputted by the sensing means is equal to the number of particles in the sample flow.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the particle classification employing plane polarized radiation applied in three orthogonal directions of Downing et al. to incorporate the teaching of means for measuring the volume concentration of conductive particles taught by Russell et al. since Russell et al. teach that such an arrangement is beneficial to provide a system design for aerosol measurements with significantly improved spatial and temporal resolution, automated flow control, and high counting efficiency as disclosed in column 5, lines 1-20.

5. Claims 4, 5, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Downing et al. in view of Gondar, Russell et al. and Miller et al. (US 4,015,464 A).

Downing et al. and Gondar teach all that is claimed as discussed in the above rejection of claims 1, 11, 12, 14 and 21, but they do not specifically teach the following:

- Means for measuring the air volume flow rate, means for counting the number of signals outputted by the sensing means per unit time, and means for measuring the average height of the signals outputted by the sensing means per unit time.

However, Russell et al. teach an automated mobility-classified-aerosol detector comprising:

With regard to claims 4 and 18, means (FIG. 1, flow meters 140 and 142) for measuring the air volume flow rate, and means (FIG. 1, condensation nucleus counter (CNC) 162) for

counting the number of particles in the sample flow per unit time (From column 5, line 65 to column 6, line 43).

As inherency from Downing et al. reference, each time a particle enters the cavity, the E field drops, then the sensing means senses the drop of the E field and outputs a signal. Therefore, the number of signals outputted by the sensing means is equal to the number of particles in the sample flow.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the particle classification employing plane polarized radiation applied in three orthogonal directions of Downing et al. to incorporate the teaching of means for measuring the volume concentration of conductive particles taught by Russell et al. since Russell et al. teach that such an arrangement is beneficial to provide a system design for aerosol measurements with significantly improved spatial and temporal resolution, automated flow control, and high counting efficiency as disclosed in column 5, lines 1-20.

In addition, Miller et al. teach an ultrasonic continuous wave particle monitor comprising:

With regard to claims 4 and 18, means (FIG. 1, pulse height analyzer 105) for measuring the average height of the signals outputted by the sensing means (Column 5, lines 38-63 and from column 6, line 56 to column 7, line 15).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the particle classification employing plane polarized radiation applied in three orthogonal directions of Downing et al. to incorporate the teaching of means for measuring the average height of the signals outputted by the sensing means taught by Miller et al. since Miller et al. teach that such an arrangement is beneficial to provide a system

using a pulse height analyzer to detect the number of particles of a particular size present in the fluid medium as disclosed in column 5, lines 38-63 and from column 6, line 56 to column 7, line 15.

With regard to claims 5 and 19, Miller et al. also discloses means for displaying the count of signal outputted by said sensing means (Column 6, lines 38-50).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the particle classification employing plane polarized radiation applied in three orthogonal directions of Downing et al. to incorporate the teaching of means for displaying the count of signal outputted by said sensing means taught by Miller et al. since Miller et al. teach that such an arrangement is beneficial to provide a visual or other indication that particles exceeding a predetermined minimum size present in the fluid medium as disclosed in column 6, lines 38-50.

6. Claims 13, 15 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Downing et al. in view of Gondar and Mathur (US 6,563,250 B2).

Downing et al. and Gondar teach all that is claimed as discussed in the above rejection of claims 1, 11, 12, 14 and 21, but they do not specifically teach the following:

- An excitation frequency slightly higher than said resonant frequency.

However, Mathur teaches a piezoelectric damping system for reducing noise transmission through structures comprising:

With regard to claims 13, 15 and 22, supplying an excitation frequency slightly higher than the resonant frequency (From column 3, line 38 to column 4, line 37).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the apparatus and method for current sensing of Downing et al. to incorporate the teaching of supplying an excitation frequency slightly higher than the resonant frequency taught by Mathur since Mathur teaches that such an arrangement is beneficial to provide a system for carrying more of the energy being transmitted to compensate the transmission loss by airborne noise transmission through the transmission structure as disclosed from column 3, line 38 to column 4, line 37.

Allowable Subject Matter

7. Claims 6 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. A statement of reasons for the indication of allowable subject matter was expressed in the previous Office Action mailed on June 10, 2005.

8. Claim 10 is allowed. A statement of reasons for allowance was expressed in the previous Office Action mailed on June 10, 2005.

Response to Arguments

9. Applicant's arguments with respect to independent claims 1, 11, 12, 14, and 21, along with their dependent claims 2-6, 13, 15-20, 22 and 26-30 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant's attention is invited to the followings whose inventions disclose similar devices.

- Malachowski et al. (US 6,931,950 B2) teaches a system and processes for particulate analysis.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

CONTACT INFORMATION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoai-An D. Nguyen whose telephone number is 571-272-2170. The examiner can normally be reached on M-F (8:00 - 5:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lefkowitz can be reached on 571-272-2180. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HADN

ANJAN DEB
PRIMARY EXAMINER

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